

## IN THE CLAIMS

Please cancel claims 11-20. Please add new claim 21.

Please amend the claims as follows.

For the Examiner's convenience, all pending claims are included below.

1. (Currently Amended): An apparatus, comprising:  
a plurality of metalized planes;  
one or more dielectric layers separating the plurality of metalized planes; and  
one or more conductive trenches connecting ~~to at least one~~ more than two of the  
plurality of metalized planes.
2. (Original): The apparatus of claim 1, wherein one or more of the plurality of metalized planes has a plurality of separate segments.
3. (Original): The apparatus of claim 2, wherein at least one of the conductive trenches connects to at least one of the separate segments.
4. (Original): The apparatus of claim 1, wherein at least one of the plurality of metalized planes connects to power.
5. (Original): The apparatus of claim 1, wherein at least one of the plurality of metalized planes connects to ground.
6. (Original): The apparatus of claim 3, wherein at least one of the separate segments connects to power.
7. (Original): The apparatus of claim 3, wherein at least one of the separate segments connects to ground.
8. (Original): The apparatus of claim 1, wherein at least one of the conductive trenches connects to least two of the metalized planes and one or more metalized planes in-between the

connected metalized planes are isolated from the connecting conductive trench.

9. (Original): The apparatus of claim 1, wherein at least one of one or more conductive trenches is thermally conductive.

10. (Original): The apparatus of claim 1, wherein at least one of the one or more conductive trenches is electrically conductive.

11-20 (Cancelled)

21. (New): A printed circuit board comprising:

a plurality of metalized layers, each of the metalized layers separated from another of the metalized layers by a dielectric layer; and

one or more conductive trenches, at least one of the conductive trenches connected to a corresponding metalized layer of the plurality of metalized layers.

### **REMARKS**

Reconsideration of this application as amended is respectfully requested.

Claims 1-10 and 19-20 are pending. Claims 1-10 and 19-20 stand rejected.

Claim 1 has been amended. Claims 11- 20 have been cancelled. New claim 21 has been added. Support for the amendment and new claim 21 is found in the specification, the drawings, and in the claims as originally filed. Specifically, support for new claim 21 is found in the specification at paragraph 40. Applicants submit that the amendment does not add new matter.

### **Rejections Under 35 U.S.C. § 112**

The Examiner has rejected claims 1, 19 and 20 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. The Examiner has stated that

Regarding claims 1, 19 and 20, “one or more conductive trenches connecting to at least one of the plurality of metalized planes” is not clear.

The trench is connecting at least two of the metalized planes.

(Office Action mailed 6/18/2003, page 3, paragraph 6)

In response, applicants have amended claim 1 and cancelled claims 19 and 20.

### Rejections Under 35 U.S.C. § 102(e)

Claims 1-8, 10 and 19 stand rejected under 35 U.S.C. § 102(e) as being anticipated by US Patent Application Publication Number 2002/0130739 of Cotton ("Cotton"). The Examiner stated that:

Regarding claims 1 and 19, Cotton discloses an apparatus, comprising:  
a plurality of metalized planes (see figure 1 and 13);  
one or more dielectric layers separating the plurality of metalized planes (see figures 1 and 13); and  
one or more conductive trenches connecting to at least one of the plurality of metalized planes (trenches 150, 850, see figure 1 and 13).

Regarding claim 2, Cotton further discloses a plane with plurality of segments, (three segments of the conductive layer 116, see figure 1).

Regarding claim 3, Cotton further discloses a trench connects to a separate segment, (two trenches on the right side connecting to two separate segments of the conductive layer 116, see figure 1).

Regarding claims 4-7, the conductive planes segments of Cotton are inherently used as a power/ground layers, depending upon the requirement.

Regarding claim 8, Cotton further discloses at least one of the conductive trenches connects to least two of the metalized planes and one or more metalized planes in-between the connected metalized planes are isolated from the connecting conductive trench, see figure 1 and 13.

Regarding claim 10, Cotton further discloses at least one of the conductive trenches electrically conductive, plated through column 3, paragraph 0038.

(Office Action mailed 6/18/2003, page 4, paragraph 3 – page 5, paragraph 4)

Applicants respectfully submit that claim 1 as amended is not anticipated by Cotton under 35 U.S.C. § 102(e). Amended claim 1 includes the following limitations:

An apparatus, comprising:  
a plurality of metalized planes;  
one or more dielectric layers separating the plurality of metalized planes; and  
one or more conductive trenches connecting more than two of the plurality of metalized planes.

(Amended claim 1) (Emphasis added)

In contrast, Cotton does not disclose one or more conductive trenches that connect more than two metalized planes. The tubes of Cotton connect two layers.

Given that claims 2-10 depend directly or indirectly from claim 1, applicants respectfully submit that claims 2-10 are likewise not anticipated by Cotton.

New claim 21 includes the following limitations.

A printed circuit board comprising:  
a plurality of metalized layers, each of the metalized layers separated from another of the metalized layers by a dielectric layer; and  
one or more conductive trenches, at least one of the conductive trenches connected to single corresponding metalized layer of the plurality of metalized layers.

(New Claim 21) (Emphasis added)

In contrast Cotton does not disclose a conductive trench that connects to a single corresponding metalized layer. The tubes of Cotton connect two layers.

### **Rejections Under 35 U.S.C. § 103(a)**

Claims 9 and 20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication Number 2002/0130739 of Cotton ("Cotton"), as applied to claims 1-8, above. The Examiner has stated that

Regarding claim 9, the applicant is claiming the trench thermally conductive.

Though, Cotton does not explicitly disclose the thermal conductivity of the trenches. The trenches are made by plating, which will generally be a metal plating, and will be inherently be thermally conductive. As such, metal plated vias or metal filled vias are well known in the art, and can be used, either for transmitting electrical signal, or for transmitting the heat depending upon the specific requirement.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the apparatus of Cotton with thermally conductive trenches in order to have the desired functionality of transferring heat."

(Office Action mailed 6/18/2003, page 6, paragraphs 2-4)

For the reasons discussed above, applicants respectfully submit that amended claim 1 and new claim 21 are not obvious under 35 U.S.C. § 103(a) in view of Cotton.

Given that claims 2-10 depend directly or indirectly from claim 1, applicants respectfully submit that claims 2-10 are likewise not rendered obvious by Cotton.

It is respectfully submitted that in view of the amendments and arguments set forth herein, the applicable rejections and objections have been overcome. If there are any additional charges, please charge Deposit Account No. 02-2666 for any fee deficiency that may be due.

Respectfully submitted,

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